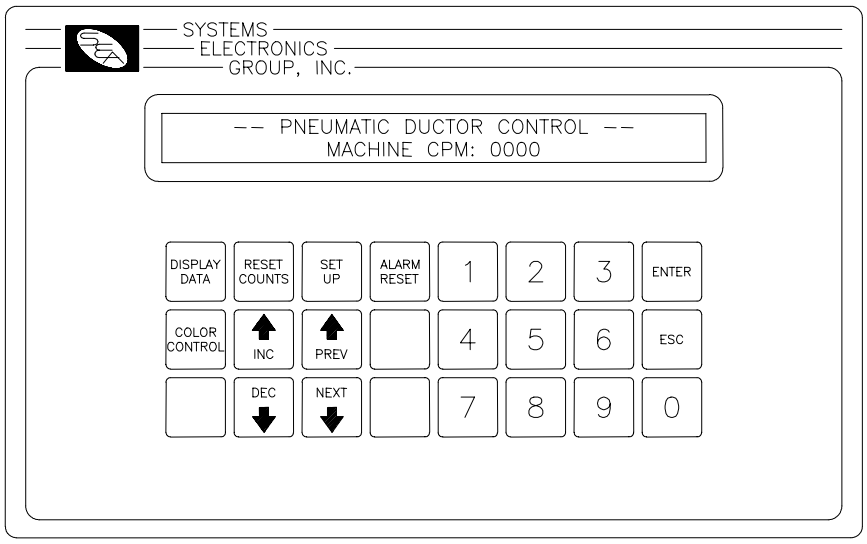
SECTION 3
USING THE KEYPAD/DISPLAY

The Keypad/Display of the HSM-DUCTOR contains 24 keys consisting of 12 function keys, and a numeric keypad and a 2 line by 40 character back-lit LCD display. The Keypad/Display can be used to view data, modify all set-up parameters or adjust the color control settings.



Note: For virtually all the menus, the "NEXT" and "PREV" keys can be used to advance to the next item of the menu or return to the previous item on the menu.

3.1 OVERVIEW OF KEYPAD AND DISPLAY

<NEXT>: Pressing this key moves to the next adjustment field or displays the next menu or display. Holding this key depressed for one second will move to the next field or display continuously. If all displays have been shown the system will exit to the main default display.

<PREV>: (Previous): Pressing this key moves to the previous adjustment field or displays the previous menu or display. Holding this key depressed for one second will move to the previous field or display continuously. If display selection is returned to the top of the order this key will have no effect.

<INC>: (Increment): Pressing this key once increments the currently selected field value by one. Holding this key depressed for one second will increment the currently selected field continuously. This key is only active in the adjustment mode.

<DEC>: (Decrement): Pressing this key once decrements the currently selected field value by one. Holding this key depressed for one second will decrement the currently selected field continuously. This key is only active in the adjustment mode.

<DISPLAY DATA>: (Cycle Counts): Pressing this key displays the total number of cycles for each ductor. Pressing this key the first time displays the counts for ductors 1 and 2, press the **<NEXT>** to advance to the next display, **<PREV>** to retard to the previous display. The display will automatically advance to the next display approximately every 7.5 seconds until all cycling counts have been displayed.

<RESET COUNTS>: Pressing this key allows the total cycle counts for each ductor to be reset. A prompt is displayed asking which ductor to reset. Enter the corresponding number of the ductor to reset that individual ductor count. Press **<0>** to reset all the ductor counts. Press **<ESC>** to reset none of the ductor counts and return to the main menu.

<SET UP>: Pressing this key allows the user to set-up the ductor configuration parameters. This key is only active when set-up has been enabled.

<ALARM RESET>: Pressing this key resets any active ductor fault alarms (feedback detected failure). This key is only active when the main default display or fault display is active

<COLOR CONTROL>: Pressing this key allows the operator to select a new label number, adjust the “Cycle” and “On” durations, independently for each ink stations or program a new label from scratch. This key is passcode protected when the “Set-Up” switch is not disabled.

When the “Color Control” key is depressed, the label selection screen is displayed. The operator may enter in a new label number or simply press the **<NEXT>** or **<ENTER>** keys to advance to the station adjustment menus.

A number of different screens are shown on the display of the HSM-DUCTOR. The primary screen displays the machine cpm. Other screens displayed include the cycling counts data display, reset cycling counts display, passcode entry menu and the set-up menu.

3.2 RECOMMENDED PROCEDURE FOR USING THE HSM-DUCTOR

On the original mechanically cammed ductor, the keys on the fountain were used both to control the areas on the can that the ink was to be applied as well as the color quality (light/dark) of the color. Thus the keys were adjusted proportionally to where on the can the color was located as well as how much area the color covered and how dark the color was.

With the pneumatic ductor, the color quality is now controlled by the frequency and duty cycle of the ductor (as set by the operator through the Keypad/Display). The fountain keys are simply used to define the locations (top, bottom, middle, etc.) the color is located on the can. The keys should not be adjusted proportional as before, but should be either closed at areas where there will be no color on the can, or opened (a predefined number of turns) on areas where the color is located on the can.

This allows label changes to occur quicker by simply setting the keys open or closed at the locations required on the can, and selecting the label number for the respective label on the Keypad/Display (thus setting the color quality to the same level as previously set for that label).

The M4503 is capable of saving the settings for up to 100 labels. As different labels are run, the labels programmed are added to the internal data base. When a programmed label is run again, simply recall the label number and the ductors will oscillate at the same frequency and duty cycle the last time the label was run. The only additional set-up required at label change over is to set the keys open and closed at the required areas on the can.

The following sections describe the recommended procedure for setting up a label and the recommended procedure for a label change over using a label, which has previously been programmed into the color control.

3.3 SET-UP PNEUMATIC DUCTOR PARAMETERS

This menu is activated when the "Set-up" key is pressed. The following set-up parameters may then be adjusted or viewed:

Note: For virtually all the menus, the <NEXT> and <PREV> keys can be used to advance to the next or previous parameter respectively. To change the currently displayed parameter, simply enter the new value on the numeric keypad and press <ENTER>. The value will be entered and the next parameter will automatically be displayed. When the last parameter in a section is entered, the primary set-up menu is again displayed. Pressing <ESC> at anytime will exit back to the main display menu.

The following parameters are used to define the ductor configuration:

Maximum "Cycle" Duration: The maximum "Cycle" duration is set to $1/10^{th}$ of a can resolution. The range of this parameter is from 140 to 650 and defines the upper limit or the longest amount of time between ductor cycles. Care should be taken not to set this parameter too low, as this would restrict the operators range of adjustment. The "Cycle" duration is set individually for each ink station and is the rate at which ink is transferred from the fountain roll.

Maximum "On" Duration: The maximum "On" duration is set to $1/10^{th}$ of a can resolution. The range of this parameter is from 0 to 200 and defines the upper limit or the longest amount of time the ductor roll can be in contact with the fountain roll. The "On" duration is set individually for each ink station and is the amount of time the ductor roll is in contact with the fountain roll.

Response Time Compensation: The response time compensation parameters is used to adjust the "On" duration based on the difference between the "ON" and "off" response time of the ductor solenoid. As and example, if the "ON" response time were 40 msec. and the "off" response time was 15 msec., then this parameter would need to be set to 25 msec.

The "ON" response time is defined as the time ductor is activated to the time it comes in contact with the fountain roll. The "off" response time is the time the ductor is deactivated to the time it lifts off of the fountain roll. If the optional feedback sensors are to be used, this parameter should be set to zero.

Color Gain: This parameter allows the color density to be increased proportionately up or down as a function of machine speed. The valid range of this parameter is 50% to 150% per 2000 CPM. When set to 100%, no increase or decrease, as a function of speed will occur. When set to 50%, the color density will drop 50% from 0 to 2000CPM. When set to 150% the color density will increase by 50% from 0 to 2000CPM. This parameter is used to compensate for ink atomization (misting) as a function of speed (higher speed = proportionately higher ink misting).

Feedback Enable (stations 1 – 8): This parameter enables the individual feedback faults and should only be enabled when the optional feedback sensors are used. Once enabled, the M4503 will verify that the ductor is cycling properly. If a ductor is not detected as cycling properly, the "Ductor Feedback Fault" is energized, indicating a problem with the ductor cycling control.

If a "Ductor Feedback Fault" does occur, the ductors should be manually activated to verify proper cycling operation, as well as, the sensor for proper feedback operation. The feedback sensor should be set such that it is only "ON" when the ductor is in contact with the fountain roll.

3.4 SELECTING THE LABEL NUMBER

To select a label, perform the following:

1) Press the **<COLOR CONTROL>** key to enter the adjustment mode.

2) If the prompt "ENTER PASSCODE:" is displayed, enter the corresponding 1 to 5 digit passcode on the numeric keypad and press **<ENTER>**. If the prompt "ENTER PASSCODE: INCORRECT PASSCODE" is displayed, enter the correct passcode and press **<ENTER>**.

3) The "LABEL" field is displayed. Enter a new label (0-99) on the numeric keypad and press **<ENTER>** or press the **<NEXT>** key to use the existing label.

   Note: The decorator must be stopped in order to change the label number.

4) If no further changes are to be made to the ink stations settings, press **<ESC>** to exit.

3.5 LIGHT / DARK COLOR ADJUSTMENT OF INK STATION

The “On” duration and “Cycle” duration for each ink station can be set individually for each label number. The “On” duration can be viewed as a “Course” adjustment and the “Cycle” duration can be viewed as a “Fine” adjustment. Observe how changing either the “On” duration or “Cycle” duration, changes the relative “Color Density”.

Note: If an ink station is not used, simply set its “On” duration to zero to disable the cycling operation.

Use the “Color Density” display as an indication of the amount of ink being transferred by the ductor. Different settings of the “On” and “Cycle” durations will achieve the same “Color Density”.

Note: To reduce "Light" and "Dark" variations in print between cycle times, adjust both the "On" duration and "Cycle" duration down to achieve the same "Color Density".

For a new label or existing label that needs color adjustment, perform the following:

1) Press the **<COLOR CONTROL>** key to enter the adjustment mode if not already in adjustment mode.

2) To select the desired ink station for adjustment, press the **<NEXT>** or **<PREV>** keys until the desired ink station is displayed.

3) To lighten the color, start by decreasing the "On" duration or increasing the "Cycle" duration. Watch the "Color Density" to see how your adjustments change this value. Remember, think of the "On" duration as a "Course" adjustment and the "Cycle" duration as a "Fine" adjustment.

4) To darken the color, start by increasing the "On" duration or decreasing "Cycle" duration. Watch the "Color Density" to see how your adjustments change this value. Once again, think of the "On" duration as a "Course" adjustment and the "Cycle" duration as a "Fine" adjustment.

5) Check the color quality and continue to increase or decrease the "Color Density" until the desired color quality is achieved.

6) Perform steps (2) through (4) above for all ink stations used as necessary.

7) Once the label quality is satisfactory, press the **<ESC>** key to exit the adjustment mode and save the changes for the selected label.

3.6 CHANGE OVER USING AN EXISTING LABEL IN THE HSM-DUCTOR

When a label is to be run again, perform following to set-up the label at change over.

1) Select the respective label number on the Keypad/Display.

2) Set the keys open (predefined number of turns, a number which is used for all ink stations on all labels) on the areas of the can that will have ink and closed on areas that will not have ink.

3) Run the machine and verify that ink is being distributed on the can correctly. The ink will be metered at the same rate as previously set the last time the label was run. Thus only minor adjustments to the keys may be necessary to assure that ink is not distributed to areas where no color is applied (resulting in slinging due to ink build up).

3.7 VIEWING THE TOTAL NUMBER OF CYCLES FOR EACH DUCTOR

The total number of cycles for each ductor is accumulated in the M4503. This is used for life expectancy and predictive maintenance purposes to determine when air cylinders or solenoids should be replaced. To view the number of cycles for each ductor, perform the following:

1) Press the **<DISPLAY DATA>** key. The total number of cycles for ductors 1 and 2 will be displayed.

2) To view the counts for ductors 3 and 4, press **<NEXT>** key. The counts for ductors 3 and 4 will be displayed.

3) Continue pressing the **<NEXT>** key to view the counts for the remaining ductors.

3.8 RESETTING THE TOTAL NUMBER OF CYCLES FOR EACH DUCTOR

To reset the total number of cycles for each ductor, perform the following. Note this procedure should only be performed when replacing a component (air cylinder, solenoid, etc.) for a particular ductor.

1) Press the **<RESET COUNTS>** key. The "Reset Ductor Cycle Counts" screen will be displayed.

2) To reset an individual ductor count, press the corresponding number of that ductor (1 to 8) and press **<ENTER>**. The cycle count for that ductor will be reset.

3) To reset the counts for all the ductors, press **<0>** and then **<ENTER>**.

4) To exit out of the screen without resetting any of the ductor counts, press **<ESC>**.